DOCUMENT RESUME

ED 048 359 TM 000 435

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TITLE	Selecting Tests for an Open Admissions Population.
INSTITUTION	City Univ. of New York, N.Y. Div. of Teacher Education.
PUB DATE	Feb 71
NOTE	10p.; Paper presented at the Annual Meeting of the American Educational Research Association, New York, New York, February 1971
EDRS PRICE	EDRS Price MF-$0.65 HC-$3.29
DESCRIPTORS	Basic Skills, *College Students, *Diagnostic Tests, Evaluation Methods, *Open Enrollment, Program Planning, Reading Tests, *Remedial Programs, Testing Programs, *Test Selection

ABSTRACT

The establishment of an open admissions policy necessitated an evaluative procedure to identify groups requiring remedial instruction and to assist in estimating budgeting and staffing needs. This study was undertaken, therefore, to select tests in reading and mathematics which would: (1) discriminate adequately between non-college and college preparatory groups, in the traditional meaning of these groups; (2) have "floor" adequate to provide discrimination in the lower ranges of the test distribution; (3) be accepted by those in the top of the distribution, even though "ceiling" effects would be present. Results indicated the wide range in achievement and changing nature of the university population was more typical of a general high school population than a college preparatory one. The relative accuracy in selecting tests with the desired characteristics will permit studies on the non-selected open admissions population. (Author/TA)

ED 048359

Selecting Tests for an Open Admissions Population

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Background

The City University announced an open admissions policy in the Fall, 1969. Prior planning of the university called for an open admissions policy to be implemented by 1975. Due to the demands of student and other groups, the policy was approved for implementation by the Fall, 1970. Under the open admissions policy, graduates of any high school in the city can apply and are admitted to the City University. The Office of Institutional Research and Program Evaluation of the Division of Teacher Education was asked to conduct a study to determine the level of tests which might be most appropriate for the new, open admissions population. It was anticipated that tests might be used to identify groups requiring remedial instruction and assist in budgeting and staffing estimates.

While the major purpose of the project was to determine an appropriate level of tests to be administered, discussion also centered on the type of tests to be administered. Several sources of information could provide the basis for recommending remedial instruction and counseling students, as well as providing budgeting estimates for staff and other requirements. These sources of information include: 1. those which draw upon past student achievement and are summarized as the high school average or rank in class; and 2. scores from several types of standardized tests. The supplementary test scores could be the result of tests administered for either rapid, broad screening purposes (for placement in regular or remedial courses of basic skills in reading/English and mathematics) and/or diagnostic and guidance purposes (for placement and guidance over a large number of subject matter and career areas).

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For purposes of the present study it was assumed that: 1. initial decisions about budgeting, staffing, and placement in regular or remedial programs could be made using high school averages, with the supplement of reading and arithmetic tests providing general information on rough grouping; 2. no comprehensive test battery would be administered on an all-university basis to entering freshmen, since no single battery would be suitable for the anticipated wide range of

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[1]Now at the University of Georgia

achievement represented in the entering freshmen group; and 3. any comprehensive test batteries would be selected and administered by the colleges, since they could vary the batteries as appropriate for different student groups.

The choice of reading and arithmetic achievement tests for consideration as supplementary information was made on both political and psychometric grounds. First, on political grounds was the history of the objection of minority groups to the use of information provided by the high schools, and their preference for data provided by an independent source. On psychometric considerations, the evidence available from tests such as the Scholastic Aptitude Test, containing verbal and mathematical items, indicates that these measures are useful predictors of college grades. The selection of tests which measured reading/verbal and arithmetic skills seemed to be the most parsimonious approach.

Purpose

The purpose of this study was to select tests which would:

1) discriminate adequately between non-college preparatory and college preparatory groups, in the traditional sense of these groups;
2) have floor adequate to provide discrimination in the lower ranges of the test distribution; and
3) be accepted by those in the top of the distribution even though ceiling effects would be present.

It was recognized at the outset of the study that a single test could not hope to satisfactorily measure the range of achievement over the entire open admissions distribution. The tests to be selected should provide measurement in the lower half of what was anticipated to be a general high school population distribution. Some of the students under open admissions would not have taken a curriculum preparing them for college, but would be graduates of general, vocational and commercial high schools. The tests should measure these students, with most scores falling above the chance level.

Instruments

The tests compared in the present study were all published achievement tests in reading and arithmetic. The selection of the tests for comparison was, in some aspects, rather arbitrary. A major consideration was that two levels of the test be available, a junior and a senior high school level, or that the test be judged to provide adequate measurement in the eighth, ninth, and tenth grade range. A majority of students admitted under the open admissions policy would not have had more than junior high school mathematics. Therefore, a standardized high school level mathematics test was likely to be inappropriate.

Six reading tests and five mathematics tests were selected for a pilot project and grouped into five blocks for test administration purposes.

I Davis Reading Level 2(Junior High School)
Stanford Advanced Mathematics (Junior HS) Computation and Concepts

II Stanford High School Reading
Stanford High School Arithmetic
Davis Level 1 (High School)

III STEP Reading 2A (High School)
Stanford Advanced Mathematics (Junior HS) Computation only

IV STEP Reading 3A (Junior High School)
Cooperative Arithmetic Test

V Stanford Advanced Reading (Junior High School)
STEP 2A Mathematics (High School)

In addition to the tests, each student was administered a questionnaire. The questionnaire asked for opinions on each reading and mathematics test taken, on areas such as ease, fairness, interest, sufficient time. General questions about the type of tests were included: practice in tests like these? easy to cheat? upset by any part of the testing? The opinion questions were asked since it was felt the tests selected should be perceived by students as positively as possible in these areas. Questions also asked for high school average and whether students felt they would need remedial help in reading and/or mathematics to do well in college work.

Sample

The design for the study called for samples of high school and college students to be randomly assigned to one of the five testing blocks within each high school and college participating in the study. A total of 600 students were requested at the high school level (with 500 expected for analysis); and 600 at the college level (with 500 expected for analysis). Each subject was to be paid $5.00 for participating in the study.

The design was carried out for the high school sample using five high schools selected to be representative of each of the four types of high schools in the city. The high schools were selected by the Assistant Superintendent of High Schools for New York City. The high schools ranged from those labelled academic, which included primarily students in a college preparatory course, to the general, commercial and vocational high schools (two of the latter high school were included because of smaller graduating class sizes). The numbers for the testing blocks

ranged from 78 to 105: 78, 90, 93, 95 and 105. (Total N = 461)

Two senior colleges and two community colleges at CUNY agreed to participate. However, even though five dollars were offered as an incentive, students did not volunteer (in response to letters sent to randomly selected freshmen and special program students). The timing of the project (December-February) contributed to the problem of obtaining a college sample, although the college staffs tried to obtain student cooperation. The number of students willing to participate was small, and was approximately halved when the actual testing sessions were held. Since only small numbers were tested at each institution, and given the design of randomly allocating within institution to testing block, the data were not sufficient for analysis (Numbers per block ranged from 19 to 44, far below the desired 100 per block). Consequently, the selection of test and this study were based on the data from the high school sample.

Results

Table 1 presents the raw score means and standard deviations for the reading and arithmetic tests. Tables 2 and 3 show the responses to the questionnaire for the questions about the reading tests and arithmetic tests.

1. Reading Tests

Comparison of the graphs for the reading tests indicated that the junior high school level tests did not have adequate ceiling. The senior high school level tests had adequate ceilings, with the more desired rectangular distribution apparent for the Davis and Stanford tests. (Since the high schools had been selected to represent general levels along the achievement distribution, it was anticipated that tests should show a rectangular distribution.)

Students judged the Davis high school level test as too hard more often than the Stanford (27% and 11% respectively). Ratings on time also favored the Stanford (41% not enough time on Stanford; 61% on Davis). The test and student judgment data resulted in the selection of the Stanford high school reading test.

2. Mathematics Tests

Three mathematics tests had approximately rectangular distributions, and student opinions were checked to assist in the selection of the test.[1]

The Stanford high school level Arithmetic was dropped from further consideration, since a higher percentage of students judged the problems as very different than

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[1] STEP high school level was eliminated because it was too difficult; Stanford Concepts, junior high school level, was eliminated because range was inadequate.

what they were used to doing in classes (higher when compared to percentages for the junior high school level tests). The choice was made between the Coop and the Stanford Computation tests on practical and economic grounds: the convenience and savings of having both the reading and mathematics tests from the same publisher.

3. Population Test Results

The Stanford High School reading test and Advanced Mathematics (junior high school level) were administered on May 1, 1970 to 31,635 admitted high school seniors. The sample means and standard deviations for the mathematics test were almost identical with the results of the population testing. The reading test mean of the present study was 2.82 raw score points lower than that for the population.

	Stanford High School Reading			Stanford Advanced Mathematics (Computation)		
	N	M	SD	N	M	SD
Sample	105	36.25	11.64	94	27.39	9.59
Population	31,364	39.07	11.64	31,364	27.73	9.83

A comparison of the open admissions population data with published norms shows that the mean on the Stanford High School reading test was at the 38th percentile on a national sample for grade twelve high school students, and at the 24th percentile for college preparatory norms.

There is no comparable normative group for the Stanford Advanced Mathematics, Computation test, since it is part of a junior high school level battery. The only tentative comparison which can be made is with the national norms for grade nine. This shows the open admissions population mean to be at the 52nd percentile for the national norms for grade nine.[1]

Discussion

This study provides data of interest in two areas:

1. the use of a carefully selected small sample of high schools to approximate the range of the population distribution; and
2. the nature of the population admitted to a large urban university under an open admissions policy.

1. In this study the sample of high schools was selected to cover the range of achievement in the high school population, rather than relying on a random sample

[1] For further discussion of the population test results, see Kay, P. Open Admissions Reading and Mathematics Tests, May 1970. Report 70-7, June 1970. Office of Institutional Research and Program Evaluation, Division of Teacher Education, City University of New York.

approach. The careful specification of the high schools appears to have permitted the original design to perform satisfactorily, even when the desired sample sizes could not be maintained. By selecting the high schools to yield an approximately rectangular distribution, it was possible to try out five blocks of tests (a total of six reading and five mathematics tests) within each of the high schools. With random assignments within high school to the testing block, the results of the sample testing approximated relatively accurately the population means, but more importantly, the standard deviations. It is recognized by the writers that the results may have occurred by pure coincidence (that is, chance) rather than as a function of the procedures. It would also be expected, that to the extent the sample means for the tests selected approximated the population values, similar results would have been expected for the non-selected tests.

Two other items in connection with the testing procedures are of interest. In a large urban area, five dollars was not a sufficient incentive for some high school students and most college students to participate in a project which required 2-1/2 hours of time. (Not an illogical reaction, if the hourly rate is computed.) Secondly, student judgments on opinion items about tests seemed to provide valuable information, at least in this project. The judgment data supported the test distribution data, and helped to make the final choices, once the statistical requirements for the test distributions were met.

2. The results of the pilot study and the population testing indicated the wide range in achievement for the accepted high school seniors on two very basic measures of reading and arithmetic computation skills. The City University is committed to an open admissions policy, and the data indicated that the reading level of the average high school senior tested in the open admissions population was at the 24th percentile on college preparatory norms.

The data indicated the open admissions population appeared more similar to a general high school population than to a college preparatory population. The adequacy of the tests used to measure the lower half of the achievement distribution should facilitate studies which follow the college careers of these students--a sizeable new group for higher education. Test validity studies and long term follow-up studies are planned.

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Table 1

Means and Standard Deviations

Reading Tests	Number	Mean	Standard Deviation
Davis Level 2 (Jr.H.S.)			
Level Score	94	28.04	7.31
Speed Score		46.74	17.51
Davis Level 1 (H.S.)			
Level Score	105	16.02	9.48
Speed Score		26,27	18.47
Stanford High School Reading	105	36,25	13.13
STEP Reading 2A	78	42.84	12,38
STEP Reading 3A	95	48,94	10.04
Stanford Advanced Reading (Jr.H.S.)	90	41.82	12.09
Arithmetic Tests			
Stanford Advanced Math (Jr.H.S.)			
Arithmetic	94	27.39	9.59
Concepts	94	28.94	7.34
(Block 3) Arithmetic	78	23.11*	10.05
Stanford High School Numerical Competency	105	30.62	9,27
Cooperative Arithmetic	95	34.15	8,75
STEP Mathematics 2A	90	24,98	8,88

* Data missing from the academic high school

Table 2

Student Attitudes toward Reading Tests*

Test	Ease			Interest			Time			Fairness		
	Too Easy	About Right	Too Hard	Very Interesting	All Right	Very Uninteresting	Not Enough	About Right	Too Much	Very Fair	All Right	Very Unfair
Davis Reading Level 2 (Jr. H. S. level)	39.4	59.6	1.1	16.3	68.5	15.2	44.1	47.3	8,6	29,8	59,6	10.6
Davis Reading Level 1 (H. S. level)	2.9	70.2	26.9	24.3	51.4	24.3	60.6	35,6	3,8	25,5	65,7	8.8
Stanford High School Reading	23.3	66.0	10.7	11.4	70.5	18.1	40.9	42.8	16.2	22.1	64.4	13.5
STEP 2A Reading (H. S. level)	26.9	67.9	5.1	24.3	64.1	11.5	20.5	48.7	30.8	48.7	44.9	8.0
STEP 3A Reading (Jr. H. S. level)	41.0	56.8	2.1	12.6	71.6	15.8	14.7	54.7	30.5	35.8	53.7	10.5
Stanford Advanced Reading - (Paragraph Meaning) (Jr. H. S. level)	36.7	62.2	1.1	16.7	76.7	6.7	35.6	53.3	11.1	33.3	57.8	8.9
	$\chi^2 = 95.6$			$\chi^2 = 24.74$			$\chi^2 = 77.79$			$\chi^2 = 18.28$		

* Percent responding to each alternative.

Table 3

Student Attitudes toward Mathematics Tests*

Test	Ease			Problem Similarity		Time			Fairness		
	Too Easy	About Right	Too Hard	Mostly Same	Very Different	Not Enough	About Right	Too Much	Very Fair	All Right	Very Unfair
Stanford Advanced Mathematics (Jr. H. S. level) (Computation & Concepts)	31.2	60.2	8.6	42.0	57.95	17.0	64.9	18.1	25.5	57.4	17.0
Stanford High School Arithmetic	54.3	38.1	7.6	35.4	64.6	19.2	51.9	28.8	38.8	40.8	20.4
** Stanford Advanced Mathematics (Jr. H. S. level) (Computation only)	36.8	50.0	13.2	54.3	45.7	70.1	24.7	5.2	41.0	33.3	25.6
Cooperative Arithmetic (Jr. H. S. level)	46.3	50.5	3.2	41.3	58.7	14.9	54.2	30.9	27.6	53.2	19.1
STEP 2A Mathematics (H. S. level)	5.6	55.0	39.3	26.1	73.9	25.6	66.7	7.8	12.3	65.2	22.5
	$\chi^2 = 95.58$			$\chi^2 = 14.07$		$\chi^2 = 105.69$			$\chi^2 = 29.38$		

* Percent responding to each alternative.
** Missing responses from an academic high school.